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PATENT SPECIFICATION

DRAWINGS ATTACHED

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Inventor: JOHN GLOVER

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COMPLETE SPECIFICATION

Disposable Hypodermic Syringe

We, J. GLOVER LABORATORIES PROPRIETARY LIMITED, a company incorporated under the laws of the State of Victoria, Commonwealth of Australia of, 567 Doncaster Road, Doncaster, State of Victoria, Commonwealth of Australia, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved hypodermic syringe which is disposable after a single use.

Disposable hypodermic syringes are known. Usually, however, such syringes are made wholly or mainly of plastics material. It has been found that, if the injection-holding portion of the syringe is of plastics material some types of injections tend to deteriorate or undergo chemical change if sealed or stored in the syringe for any length of time. Thus, the use of such disposable plastics syringes can be limited.

According to the present invention there is provided a disposable hypodermic syringe comprising a tubular body member moulded in plastics material and having one end open while the other end has a double-ended hypodermic needle fitted into it with the inner end of said needle projecting into the interior of the body member, an injection-holding cartridge of glass accommodated in said tubular body and having a puncturable diaphragm at its inner end, the cartridge being moveable longitudinally relatively to the needle for puncturing of the diaphragm by the inner end of the needle, and a slidable plunger to eject the injection, and a needle sheath of plastics material fitted to said other end of the body member to seal the needle aseptically and adapted, when removed, to have one end thereof inserted into the end of the cartridge opposite to said inner end thereof to slide the plunger to eject the injection after the diaphragm of the cartridge has been punctured by the inner end of the needle.

Preferably said sheath end is so constructed that it connects with the plunger in such manner as to enable the plunger to be retracted for aspiration purposes prior to injection.

The inner surface of the body member preferably also has one or a plurality of internal annular ribs or rings engaging the inner end of the glass cartridge to form a bacteriological seal for the inner end of the hypodermic needle and also to hold the cartridge in position in the body member prior to the puncture of the diaphragm of the cartridge.

In order that the invention may be more readily understood the following description is given, merely by way of example, with reference to the accompanying drawing, in which:—

FIGURE 1 is a longitudinal sectional view of one embodiment of a complete syringe as packed in assembled state for sale;

FIGURE 2 is a similar view to Figure 1, but showing the syringe in use; and

FIGURE 3 is a detail sectional view of the plunger of the injection-holding cartridge.

Referring to the drawing, the syringe comprises a tubular body member 1, a glass injection-holding cartridge 2 accommodated with said body member and a plastics needle sheath 3. The tubular body member 1 is made as a moulding in polypropylene or other suitable plastics material with two laterally projecting finger lugs 4 at its rear or open end 5 while its forward end 6 is closed and has a double-ended hypodermic needle 7 fitted into it with the inner end 8 of the needle projecting a short distance into the interior of the body member.

The cartridge 2 comprises a glass tube 9 sealed at its inner end by a puncturable diaphragm 10, the latter preferably being secured in position by means of an apertured aluminium or like cap 11 applied and closed over the end of the glass tube. The injection is en-

[*Price 5s. 0d.*]

Price 2/-

closed within the inner end of the glass tube 9 between the puncturable diaphragm 10 and a slidable plunger 12 which may be of rubber or like material. The plunger has in its outer end a hole 13 opening into an enlarged internal chamber 14, see Fig. 3.

The inner surface of the tubular plastics body member 1 is provided with one, two or more internal annular ribs or rings 15 against which the inner end of the injection cartridge is pressed. Said rings serve two purposes. Firstly, by being compressed by the inner end of the cartridge, said annular rings form a very effective bacteriological seal for the inner end 8 of the hypodermic needle. Secondly, the frictional resistance created by the compression of the annular rings holds the cartridge in the desired position in the body member with its puncturable diaphragm 10 just clear of the inner end 8 of the needle.

The forward end of the plastics body member 1 is formed with a cylindrical portion 16 which receives the plastics needle sheath 3. The latter is of hollow formation to enclose the forward end 17 of the needle and its inner wall, or, alternatively, the surface of the cylindrical portion 16 on the body member is formed with one, two or more annular ribs or rings 18 which, by being compressed when the sheath is applied, form a very effective bacteriological seal for the outer or forward end 17 of the needle.

The outer end of the plastics sheath 3 is formed with a projecting neck 19 surmounted with a pointed or conical shaped enlarged head 20 adapted to co-act with the hole 13 and enlarged internal chamber 14 in the plunger 12.

The complete unit as described is packed in assembled state for sale as shown in Fig. 1 with the injection sealed in the inner end of the glass tube 9 between the puncturable diaphragm 10 and the plunger 12. The hypodermic needle is sterilized during assembly and maintained in aseptic condition by the bacteriological seals 15 and 18 previously mentioned.

When the syringe is about to be used, the physician or other user first removes the plastics sheath 3 to expose the needle and inserts the forward end of the sheath 3 into the open rear end 21 of the cartridge and applies pressure to the end of the sheath to force it inwardly against the plunger 12. The action causes the cartridge to be moved inwardly overcoming the frictional resistance of the bacteriological sealing rings 15 so that the inner end 8 of the needle punctures and passes through the diaphragm 10 on the inner end of the cartridge. At the same time, the pointed headed end 20 of the sheath passes through the hole 13 in the plunger and engages in the internal enlarged chamber 14 of the plunger so that the sheath 3 becomes connected to the plunger in such manner as permits the plunger to be retracted.

Instead of proceeding as above, the cartridge may be pushed forwardly by pressure applied to its rear end to cause the inner end of the needle to puncture and pass through the diaphragm 10. This may be performed before the needle sheath 3 is removed from the body member 1 or inserted into the plunger 12, as above described.

The injection is injected through the needle by pressure applied on the rear end of the sheath to cause the plunger 12 to be pushed forwardly. If aspiration is required before injection, the plunger is retracted by the sheath causing blood to be sucked into the cartridge in the usual way if the needle has penetrated a blood vessel. The connection of the headed end 20 of the sheath with the plunger permits such aspiration to be effectively performed.

The syringe is disposable after a single use. The sealing and storing of the injection in the glass tube 9 enables a wider range of injections to be used while still retaining the economic disposability of the syringe because the tubular body member 1 and the sheath 3 are made of plastics material. The bacteriological sealing rings are also very effective in maintaining the needle aseptic.

It is also possible to use the bacteriological sealing rings 15 as a means for indicating whether the syringe has been used or tampered with previously. After the cartridge has been moved forwardly to cause the inner end 8 of the needle to puncture the diaphragm 10, it is very difficult to draw back the cartridge to its original position because of the presence of the sealing rings 15. Thus, prior use or any tampering with the syringe becomes at once apparent.

Various refinements and modifications may be made within the ambit of the invention. For instance, the rear end of the plastics sheath 3 may be moulded with a wide circular flange as 22 to facilitate removal of the sheath from the end of the body member 1 and also to provide a surface for the application of pressure by the thumb during injection. Said circular flange also enables the sheath to be conveniently gripped for retraction during aspiration.

WHAT WE CLAIM IS:—

1. A disposable hypodermic syringe comprising a tubular body member moulded in plastics material and having one end open while the other end has a double-ended hypodermic needle fitted into it with the inner end of said needle projecting into the interior of the body member, an injection-holding cartridge of glass accommodated in said tubular body and having a puncturable diaphragm at its inner end, the cartridge being moveable longitudinally relatively to the needle for puncturing of the diaphragm by the inner end of the needle, and a slidable plunger to eject the injection, and a needle sheath of plastics material fitted to said other end of the body member to seal the needle aseptically and

adapted, when removed, to have one end thereof inserted into the end of the cartridge opposite to said inner end thereof to slide the plunger to eject the injection after the diaphragm of the cartridge has been punctured by the inner end of the needle.

2. A disposable hypodermic syringe according to claim 1 wherein said sheath end is so constructed that it connects with the plunger in such manner as to enable the plunger to be retracted for aspiration purposes prior to injection.

3. A disposable hypodermic syringe according to claim 2, wherein said sheath end has a projecting neck surmounted by a pointed or conical shaped enlarged head and the plunger has a hole opening into an enlarged internal chamber adapted to receive said head.

4. A disposable hyodermic syringe according to claim 1, 2 or 3 wherein the inner surface of the body member has one or a plurality of internal annular ribs or rings engaging the inner end of the glass cartridge to form a bacteriological seal for the inner end of the hypodermic needle and also to hold the cartridge in position within the body member prior to the puncture of the diaphragm of the cartridge.

5. A disposable hypodermic syringe according to claim 1, 2, 3 or 4 wherein said body member other end has a cylindrical portion to receive the sheath.

6. A disposable hypodermic syringe according to claim 5 wherein the inner wall of the sheath, or alternatively, the surface of the cylindrical portion of the body member has one or a plurality of annular ribs or rings so that a bacteriological seal is formed between said cylindrical portion and said sheath.

7. A disposable hypodermic syringe according to any one of the preceding claims wherein the opposite end of the sheath has a circular flange to facilitate removal of the sheath from the body member and also to provide a surface of the application of pressure by the thumb during injection.

8. A disposable hypodermic syringe having a body member of plastics material, a glass injection-holding cartridge and a needle sheath, all constructed and functioning substantially as herein described with reference to the accompanying drawing.

J. A. KEMP & CO.,
Chartered Patent Agents,
14, South Square,
Gray's Inn, London, W.C.1.

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Fig. 1.

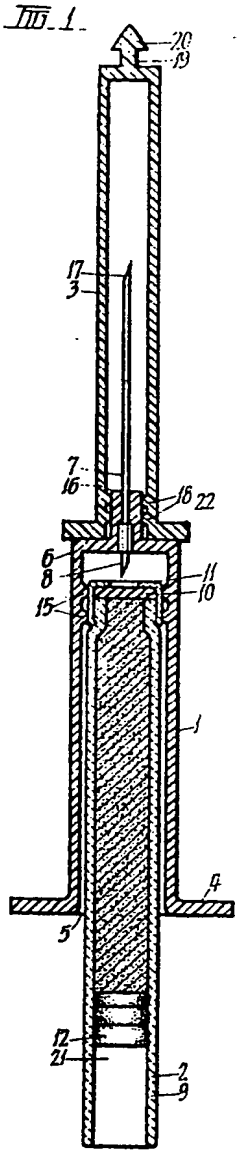

Fig. 3.

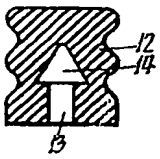

Fig. 2.